

1. A purified peptide comprising the amino acid sequence (I): Xaa₁ Xaa₂ Xaa₃ Xaa₄ Xaa₅ Cys₆ Cys₇ Xaa₈ Xaa₉ Cys₁₀ Cys₁₁ Xaa₁₂ Xaa₁₃ Xaa₁₄ Cys₁₅ Xaa₁₆ Xaa₁₇ Cys₁₈ Xaa₁₉ Xaa₂₀ Xaa₂₁ wherein: Xaa₁ Xaa₂ Xaa₃ Xaa₄ Xaa₅ is Asn Ser Ser Asn Tyr or is missing or Xaa₁ Xaa₂ Xaa₃ Xaa₄ is missing.

5

2. The purified peptide of claim 1 wherein Xaa₅ is Asn, Trp, Tyr, Asp, or Phe.

3. The purified peptide of claim 1 wherein Xaa₅ is Thr or Ile.

10

4. The purified peptide of claim 1 wherein Xaa₅ is Tyr, Asp or Trp.

5. The purified peptide of claim 1 wherein Xaa₈ is Glu, Asp, Gln, Gly or Pro.

15

6. The purified peptide of claim 1 wherein Xaa₉ is Leu, Ile, Val, Ala, Lys, Arg, Trp, Tyr or Phe.

7. The purified peptide of claim 1 wherein Xaa₉ is Leu, Ile, Val, Lys, Arg, Trp, Tyr or Phe.

20

8. The purified peptide of claim 1 wherein Xaa₁₂ is Asn, Tyr, Asp or Ala.

9. The purified peptide of claim 1 wherein Xaa₁₃ is Ala, Pro or Gly.

25

10. The purified peptide of claim 1 wherein Xaa₁₄ is Ala, Leu, Ser, Gly, Val, Glu, Gln, Ile, Leu, Lys, Arg, or Asp.

11. The purified peptide of claim 1 wherein Xaa₁₆ is Thr, Ala, Asn, Lys, Arg, Trp.

12. The purified peptide of claim 1 wherein Xaa₁₇ is Gly, Pro or Ala.

30

13. The purified peptide of claim 1 wherein Xaa₁₉ is Trp, Tyr, Phe, Asn or Leu.

14. The purified peptide of claim 1 wherein Xaa₁₉ is Lys or Arg.

15. The purified peptide of claim 1 wherein Xaa₂₀ Xaa₂₁ is AspPhe or Xaa₂₀ is Asn or Glu and Xaa₂₁ is missing.

5

16. The purified peptide of claim 1 wherein Xaa₁₉Xaa₂₀ Xaa₂₁ is missing.

17. A purified peptide comprising the amino acid sequence:

Asn Ser Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr

10 (SEQ ID NO:---; MD-915).

18. A purified peptide comprising the amino acid sequence:

Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:--; MD-1100).

15

19. A purified peptide consisting of the amino acid sequence:

Asn Ser Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr

(SEQ ID NO:---; MD-915).

20. A purified peptide consisting of the amino acid sequence:

20 Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:--; MD-1100).

21. A method for treating a gastrointestinal disorder in a patient comprising

administering a purified peptide comprising the amino acid sequence: Asn Ser Ser Asn Tyr

Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr

25 (SEQ ID NO:--; MM-416776).

22. A method for treating a gastrointestinal disorder in a patient comprising

administering a purified peptide comprising the amino acid sequence:

Asn Ser Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr

30 (SEQ ID NO:---; MD-915).

23. A method for treating a gastrointestinal disorder in a patient comprising administering a purified peptide comprising the amino acid sequence:
Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:--; MM416774)

5 24. A method for treating a gastrointestinal disorder in a patient comprising administering a purified peptide comprising the amino acid sequence:
Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:--; MD-1100).

25. A purified polypeptide comprising an amino acid sequence of any of:

10 Asn Ser Ser Asn Tyr Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Trp Gly Cys Tyr
(SEQ ID NO:--);

Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Trp Gly Cys Tyr (SEQ ID NO:---);

Asn Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Asn Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Trp Gly Cys Tyr (SEQ ID NO:---);

15 Asn Cys Cys Glu Phe Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Asn Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Asn Cys Cys Glu Trp Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Asn Cys Cys Glu Arg Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Asn Cys Cys Glu Lys Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

20 Asn Ser Ser Asn Tyr Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe
(SEQ ID NO:---);

Asn Ser Ser Asn Tyr Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Trp Gly Cys Tyr Asp Phe
(SEQ ID NO:---);

Asn Ser Ser Asn Tyr Cys Cys Glu Phe Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe
25 (SEQ ID NO:---);

Asn Ser Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe
(SEQ ID NO:---);

Asn Ser Ser Asn Tyr Cys Cys Glu Trp Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe
(SEQ ID NO:---);

30 Asn Ser Ser Asn Tyr Cys Cys Glu Arg Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe
(SEQ ID NO:---);

Asn Ser Ser Asn Tyr Cys Cys Glu Lys Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe
(SEQ ID NO:---);

Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Trp Gly Cys Tyr Asp Phe (SEQ ID NO:---);

5 Cys Cys Glu Phe Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Cys Cys Glu Trp Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Cys Cys Glu Arg Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Cys Cys Glu Lys Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

10 Asn Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Asn Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Trp Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Asn Cys Cys Glu Phe Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Asn Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Asn Cys Cys Glu Trp Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

15 Asn Cys Cys Glu Arg Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Asn Cys Cys Glu Lys Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr Asp Phe (SEQ ID NO:---);

Gln Ser Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Asn Thr Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Asn Leu Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

20 Asn Ile Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Asn Ser Ser Gln Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Ser Ser Asn Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Gln Ser Ser Gln Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

Ser Ser Gln Tyr Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:---);

25 Asn Ser Ser Asn Tyr Cys Cys Glu Ala Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);

Asn Ser Ser Asn Tyr Cys Cys Glu Arg Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);

Asn Ser Ser Asn Tyr Cys Cys Glu Asn Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);

Asn Ser Ser Asn Tyr Cys Cys Glu Asp Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);

Asn Ser Ser Asn Tyr Cys Cys Glu Cys Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);

30 Asn Ser Ser Asn Tyr Cys Cys Glu Gln Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);

Asn Ser Ser Asn Tyr Cys Cys Glu Glu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);

Asn Ser Ser Asn Tyr Cys Cys Glu Gly Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Asn Ser Ser Asn Tyr Cys Cys Glu His Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Asn Ser Ser Asn Tyr Cys Cys Glu Ile Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Asn Ser Ser Asn Tyr Cys Cys Glu Lys Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 5 Asn Ser Ser Asn Tyr Cys Cys Glu Met Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Asn Ser Ser Asn Tyr Cys Cys Glu Phe Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Asn Ser Ser Asn Tyr Cys Cys Glu Pro Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Asn Ser Ser Asn Tyr Cys Cys Glu Ser Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Asn Ser Ser Asn Tyr Cys Cys Glu Thr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 10 Asn Ser Ser Asn Tyr Cys Cys Glu Trp Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Asn Ser Ser Asn Tyr Cys Cys Glu Val Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Ala Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Arg Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Asn Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 15 Cys Cys Glu Asp Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Cys Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Gln Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Glu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Gly Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 20 Cys Cys Glu His Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Ile Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Lys Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Met Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Phe Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 25 Cys Cys Glu Pro Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Ser Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Thr Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Trp Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 Cys Cys Glu Val Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:);
 30 Asn Ser Ser Asn Tyr Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr
 (SEQ ID NO:--; MM-416776)

Cys Cys Glu Leu Cys Cys Asn Pro Ala Cys Thr Gly Cys Tyr (SEQ ID NO:--; MM416774);
and

Cys Cys Glu Tyr Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:.)

Cys Cys Glu Arg Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

5 Cys Cys Glu Asn Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Asp Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Cys Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Gln Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Glu Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

10 Cys Cys Glu Gly Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu His Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Ile Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Lys Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Met Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

15 Cys Cys Glu Phe Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Pro Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Ser Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Thr Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

Cys Cys Glu Trp Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

20 Cys Cys Glu Val Cys Cys Asn Pro Ala Cys Thr Gly Cys (SEQ ID NO:)

26. A method for treating a gastrointestinal disorder in a patient comprising administering the peptide of claim 1.

25 27. A method for treating a gastrointestinal disorder in a patient comprising administering the peptide of claim 25.

28. A method for treating a gastrointestinal disorder in a patient comprising administering a GC-C receptor agonist, a pharmaceutical acceptable carrier and a second
30 therapeutic agent selected from the group consisting of acid reducing agents including proton pump inhibitors (e.g omperazole, esomeprazole, lansoprazole, pantorazole and rabeprazole)

and H2 receptor blockers (e.g cimetidine, ranitidine, famotidine and nizatidine), promotility agents including 5HT receptor agonists (e.g Zelnorm) and motilin agonists, anti-inflammatory agents, antispasmodics, antidepressants and laxatives (e.g MiraLax) and analgesic agents.

5

29. A method for treating a gastrointestinal disorder in a patient comprising administering the peptide of any of the claims 1, 17-20 and 25, a pharmaceutical acceptable carrier and a second therapeutic agent selected from the group consisting of acid reducing agents including proton pump inhibitors (e.g omeprazole, esomeprazole, lansoprazole, pantorazole and rabeprazole) and H2 receptor blockers (e.g cimetidine, ranitidine, famotidine and nizatidine), promotility agents including 5HT receptor agonists (e.g Zelnorm) and motilin agonists, anti-inflammatory agents, antispasmodics, antidepressants and laxatives (e.g MiraLax) and analgesic agents.

10

15

30. The method of any of claims 21-24, 26, 27 and 28 wherein the gastrointestinal disorder is a gastrointestinal motility disorder.

31. The method of any of claims 21-24, 26, 27 and 28 wherein the gastrointestinal disorder is selected from the group consisting of a gastrointestinal motility disorder, irritable bowel syndrome, chronic constipation, a functional gastrointestinal disorder, gastroesophageal reflux disease, functional heartburn, dyspepsia, functional dyspepsia, nonulcer dyspepsia, gastroparesis, chronic intestinal pseudo-obstruction, colonic pseudo-obstruction, Crohn's disease, ulcerative colitis, inflammatory bowel disease and post-operative ileus.

25

32. A method for treating obesity comprising administering the peptide of any of claims 1, 17-20 and 25.

33. A method for treating congestive heart failure comprising administering the peptide of any of claims 1, 17-20 and 25.

30

34. A method for treating benign prostatic hyperplasia comprising administering the peptide of any of claims 1, 17-20 and 25.

35. The purified peptide of any of claims 1, 17, 18 and 25 wherein the polypeptide comprises the amino acid sequence DF; QHNPR (SEQ ID NO:); VQHNPR (SEQ ID NO:); VRQHNPR (SEQ ID NO:); VRGQHNPR (SEQ ID NO:); VRGPQHNPR (SEQ ID NO:); VRGPRQHNPR (SEQ ID NO:); VRGPRRQHNPR (SEQ ID NO:); or RQHNPR (SEQ ID NO:) fused to its amino terminus or its carboxy terminus.

36. The purified peptide of any of claims 1, 17, 18 and 25 wherein the purified polypeptide comprises the amino acid sequence of an analgesic peptide selected from the group consisting of endomorphin-1, endomorphin-2, nocistatin, dalargin, lupron, and substance P fused to its amino terminus or its carboxy terminus.

37. The purified peptide of any of claims 1, 17, 18 and 25 wherein the polypeptide includes no more than 10 additional amino acids at its amino terminus or carboxy terminus or both and wherein the polypeptide is a guanylate cyclase receptor agonist.

38. The purified peptide of claim 1 wherein wherein: Xaa₁ Xaa₂ Xaa₃ Xaa₄ Xaa₅ is missing; Xaa₈ is Glu; Xaa₉ is Leu, Ile, Lys, Arg, Trp, Tyr or Phe; Xaa₁₂ is Asn; Xaa₁₃ is Pro; Xaa₁₄ is Ala; Xaa₁₆ is Thr, Ala, Lys, Arg, Trp; Xaa₁₇ is Gly; Xaa₁₉ is Tyr or Leu; and Xaa₂₀ Xaa₂₁ is AspPhe or is missing.

39. A method for treating a patient suffering from constipation, the method comprising administering the polypeptide of any of claims 1, 17-20 and 25.

40. A method for increasing the activity of an intestinal guanylate cyclase (GC-C) receptor in a patient, the method comprising administering the polypeptide of any of claims 1, 17-20 and 25.

41. A method for increasing intestinal levels of cGMP in a patient, the method comprising administering the polypeptide of any of claims 1, 17-20 and 25.

42. The method of claim 41 wherein the levels of cGMP are increased in intestinal mucosa.

43. A method for increasing intestinal levels of cGMP in a patient, the method comprising administering a GC-C receptor agonist.

44. The method of claim 43 wherein levels of cGMP are increased in intestinal mucosa.

45. A method for increasing the activity of an intestinal guanylate cyclase (GC-C) receptor in a patient, the method comprising administering a GC-C receptor agonist.

46. A method for treating a gastrointestinal disorder in a patient comprising administering a GC-C receptor agonist.

47. The method of claim 46 wherein the gastrointestinal disorder is a gastrointestinal motility disorder.

48. The method of claim 46 wherein the gastrointestinal disorder is selected from the group consisting of a gastrointestinal motility disorder, irritable bowel syndrome, chronic constipation, a functional gastrointestinal disorder, gastroesophageal reflux disease, functional heartburn, dyspepsia, functional dyspepsia, nonulcer dyspepsia, gastroparesis, chronic intestinal pseudo-obstruction, colonic pseudo-obstruction, Crohn's disease, ulcerative colitis inflammatory bowel disease and post-operative ileus.

49. A method for treating obesity comprising administering a GC-C receptor agonist.

50. A method for treating congestive heart failure comprising administering a GC-C receptor agonist.

51. A method for treating benign prostatic hyperplasia comprising administering a GC-C receptor agonist.

52. A method for treating visceral pain comprising administering a GC-C receptor agonist.

53. A method for treating inflammation comprising administering a GC-C receptor agonist.

54. A method for treating constipation comprising administering a GC-C receptor agonist.

55. A method for treating visceral pain comprising administering the polypeptide of any of claims 1, 17-20 and 25.

56. A method for treating inflammation comprising administering the polypeptide of any of claims 1, 17-20 and 25.

57. A method for treating cystic fibrosis comprising administering the polypeptide of any of claims 1, 17-20 and 25.

58. A method for treating cystic fibrosis comprising administering a GC-C receptor agonist.

59. A pharmaceutical composition comprising the peptide of any of claims 1, 17-20 and 25 and a pharmaceutically acceptable carrier.

60. A pharmaceutical composition comprising the peptide of any of claims 1, 17-20 and 25 surrounded by an enteric coating.

61. A controlled release pharmaceutical composition comprising the peptide of any of claims 1, 17-20 and 25 and a biodegradable polymeric matrix.

62. A pharmaceutical composition comprising the peptide of any of claims 1, 17-20 and 25, a pharmaceutically acceptable carrier and at least one analgesic agent selected from the group consisting of: Ca channel blockers (e.g., ziconotide), 5HT receptor agonists, 5HT receptor antagonists (for example 5HT₃, 5HT₄ and 5HT₁ receptor antagonists), opioid receptor agonists (e.g., loperamide, fedotozine, and fentanyl, naloxone, naltrexone, methyl naloxone, nalmefene, cypridime, beta funaltrexamine, naloxonazine, naltrindole, and nor-binaltorphimine, morphine, diphenyloxyate, enkephalin pentapeptide, and trimebutine), NK₁ receptor antagonists (e.g., ezlopitant and SR-14033, SSR-241585), CCK receptor agonists (e.g., loxiglumide), NK₁ receptor antagonists, NK₃ receptor antagonists (e.g., talnetant, osanetant SR-142801, SSR-241585), norepinephrine-serotonin reuptake inhibitors (NSRI; e.g., milnacipran), vanilloid and cannabinoid receptor agonists (e.g., arvanil), sialorphin, sialorphin-related peptides

63. A pharmaceutical composition comprising the peptide of any of claims 1, 17-20 and 25, a phosphodiesterase inhibitor and a pharmaceutically acceptable carrier.

64. A method for treating cancer, a respiratory disorder, a neurological disorder, a disorder associated with fluid and sodium retention, a disorder associated with carbonate imbalance, erectile dysfunction, an insulin-related disorder, or an inner ear disorder, the method comprising administering the peptide of any of claims 1, 17-20 and 25.

65. A method for treating cancer, a respiratory disorder, a neurological disorder, a disorder associated with fluid and sodium retention, a disorder associated with carbonate imbalance, erectile dysfunction, an insulin-related disorder, or an inner ear disorder, the method comprising administering a GC-C receptor agonist.

66. A method of producing the peptide of any of claims 1, 17-20 and 25, comprising providing a cell harboring a nucleic acid molecule encoding the polypeptide, culturing the cell under conditions in which the peptide is expressed, and isolating the expressed peptide.

67. A method of producing the peptide of any of claims 1, 17-20 and 25, comprising chemically synthesizing the peptide and then purifying the synthesized peptide.

68. A pharmaceutical composition comprising the peptide of any of claims 1, 17-20 and 25 and a natriuretic peptide such as atrial natriuretic peptide, brain natriuretic peptide, a C-type natriuretic peptide, a diuretic, or an inhibitor of angiotensin converting enzyme.

69. A pharmaceutical composition comprising the peptide of any of claims 1, 17-20 and 25 and a 5-alpha reductase inhibitor or an alpha adrenergic inhibitor.

70. A pharmaceutical composition comprising the peptide of any of claims 1, 17-20 and 25 and gut hormone fragment peptide YY₃₋₃₆, glp-1 (glucagon-like peptide-1), exendin-4 (an inhibitor of glp-1), sibutramine, phentermine, phendimetrazine, benzphetamine hydrochloride (Didrex), orlistat (Xenical), diethylpropion hydrochloride (Tenuate), fluoxetine (Prozac), bupropion, ephedra, chromium, garcinia cambogia, benzocaine, bladderwrack (focus vesiculosus), chitosan, nomame herba, galega (Goat's Rue, French Lilac), conjugated linoleic acid, L-carnitine, fiber (psyllium, plantago, guar fiber), caffeine, dehydroepiandrosterone, germander (teucrium chamaedrys), B-hydroxy-β-methylbutyrate, or pyruvate.

71. A pharmaceutical composition comprising a GC-C receptor agonist and a natriuretic peptide such as atrial natriuretic peptide, brain natriuretic peptide, a C-type natriuretic peptide, a diuretic, or an inhibitor of angiotensin converting enzyme.

72. A pharmaceutical composition comprising a GC-C receptor agonist and a 5-alpha reductase inhibitor or an alpha adrenergic inhibitor.

73. A pharmaceutical composition comprising a GC-C receptor agonist and gut hormone fragment peptide YY₃₋₃₆, glp-1 (glucagon-like peptide-1), exendin-4 (an inhibitor of glp-1), sibutramine, phentermine, phendimetrazine, benzphetamine hydrochloride (Didrex), orlistat (Xenical), diethylpropion hydrochloride (Tenuate), fluoxetine (Prozac), bupropion, ephedra, chromium, garcinia cambogia, benzocaine, bladderwrack (focus vesiculosus), chitosan, nomame herba, galega (Goat's Rue, French Lilac), conjugated linoleic acid, L-carnitine, fiber (psyllium, plantago, guar fiber), caffeine, dehydroepiandrosterone, germander (teucrium chamaedrys), B-hydroxy-β-methylbutyrate, or pyruvate.

74. A method for treating congestive heart failure comprising administering the peptide of any of claims 1, 17-20 and 25 and a natriuretic peptide such as atrial natriuretic peptide, brain natriuretic peptide, a C-type natriuretic peptide, a diuretic, or an inhibitor of angiotensin converting enzyme.

75. A method for treating benign prostatic hyperplasia comprising administering the peptide of any of claims 1, 17-20 and 25 and a 5-alpha reductase inhibitor or an alpha adrenergic inhibitor.

76. A method for treating obesity comprising administering the peptide of any of claims 1, 17-20 and 25 and gut hormone fragment peptide YY₃₋₃₆, glp-1 (glucagon-like peptide-1), exendin-4 (an inhibitor of glp-1), sibutramine, phentermine, phendimetrazine, benzphetamine hydrochloride (Didrex), orlistat (Xenical), diethylpropion hydrochloride (Tenuate), fluoxetine (Prozac), bupropion, ephedra, chromium, garcinia cambogia, benzocaine, bladderwrack (focus vesiculosus), chitosan, nomame herba, galega (Goat's Rue, French Lilac), conjugated linoleic acid, L-carnitine, fiber (psyllium, plantago, guar fiber), caffeine, dehydroepiandrosterone, germander (teucrium chamaedrys), B-hydroxy-β-methylbutyrate, or pyruvate.

77. A method for treating congestive heart failure comprising administering a GC-C receptor agonist and a natriuretic peptide such as atrial natriuretic peptide, brain natriuretic peptide, a C-type natriuretic peptide, a diuretic, or an inhibitor of angiotensin converting enzyme.

5

78. A method for treating benign prostatic hyperplasia comprising a GC-C receptor agonist and a 5-alpha reductase inhibitor or an alpha adrenergic inhibitor.

79. A method for treating obesity comprising administering a GC-C receptor agonist and gut hormone fragment peptide YY₃₋₃₆, glp-1 (glucagon-like peptide-1), exendin-4 (an inhibitor of glp-1), sibutramine, phentermine, phendimetrazine, benzphetamine hydrochloride (Didrex), orlistat (Xenical), diethylpropion hydrochloride (Tenuate), fluoxetine (Prozac), bupropion, ephedra, chromium, garcinia cambogia, benzocaine, bladderwrack (focus vesiculosus), chitosan, nomame herba, galega (Goat's Rue, French Lilac), conjugated linoleic acid, L-carnitine, fiber (psyllium, plantago, guar fiber), caffeine, dehydroepiandrosterone, germander (teucrium chamaedrys), B-hydroxy-β-methylbutyrate, or pyruvate.

10

15